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Beauty

Susanna Cocroft

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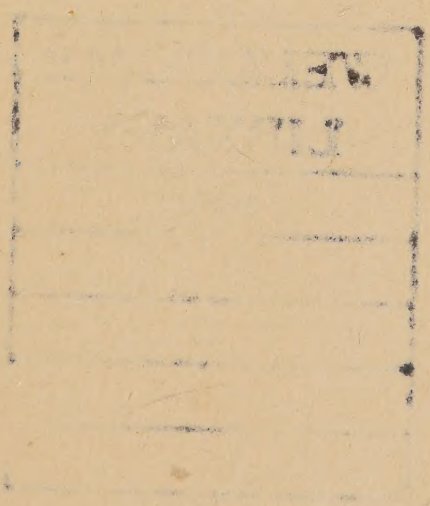
AIDS TO BEAUTY



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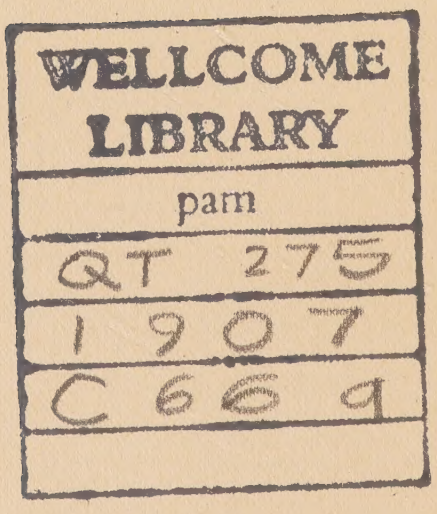

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KNOW THYSELF SERIES

BEAUTY

BY

SUSANNA COCROFT

That beauty is an incident to health is one of the prettiest mysteries of nature; that no woman is so hopelessly homely that she has not some superior feature, which can be developed so that its attraction is her dominating charm, is one of the most gratifying mysteries.

Be woman's ambition wealth, fame, the admiration of the many—or of one—health, and the natural grace and beauty that health brings, are her surest capital; and it is the duty and privilege of each to make herself as attractive, magnetic and pleasing to the eye as her natural gifts will admit of development.

Started in life with certain physical endowments, it rests with woman's intelligence to keep and to enhance these by a knowledge and observance of Nature's laws. Endowed, as a child, with the God-given beauty of form and purity of flesh, it is her duty to keep them pure and to add to them lights and shades of beautiful thoughts and purity of spirit. She thus lends to the art, refine-

ment and to the spiritual and educational uplift of the world.

"No woman is to blame if she is not beautiful at sixteen,
But she has only herself to blame if she is not beautiful at forty."
—Fra. Lippo.

To become a beautiful woman is to become one of the greatest of artists, for it not only requires a knowledge of art, in its accepted form, but it requires strength of character to control one's thoughts, which make true beauty, and to follow out any given directions.

Every woman, beautiful in feature, in thought, and consequently in bodily expression, has opened up to herself a marvelous opportunity for good, for uplift, for education, for refinement, the limitation of which is almost beyond the power of comprehension.

As the manners of uncouth people soften in the presence of refinement, so do angularities of one feature soften in the presence of a more attractive one. Glossy, abundant, well dressed hair, clear skin, radiant eyes, buoyant spirits, a symmetrical figure and gracious manners, may so engross that one has slight inclination to note inferior defects in dress or feature, providing the clothes be well fitted and well carried.

Who shall describe true beauty? The fact that it is so subtle that it eludes definition lends an added charm. It means one thing to one man, and another thing to another.

For the want of a better definition, let us say that beauty is fascination;—the fascination which pleases. Beauty of soul may attract one, of mind and character another, of hair, of eyes, of skin, of hands, of symmetry and outline of figure another, of grace of bearing another.

A face may be pleasing to the eye, yet some lines of face and feature may express a canker of the heart, thus displeasing our moral sense, and so overshadowing the

beauty of contour, of texture and color, that these no longer please.

Beauty of feature must be accompanied by beauty of soul, and of thought, to be lasting.

To the untrained eye the face of the little babe lacks individuality, but as it begins to observe and to think it takes on lights and shadows, as does the rose, in first expanding its petals to the light; as the lines of expression develop, showing the character of the thoughts, the outlines of the features are moulded, and, that the lights and shadows of expression may be pleasing, the mind must be nourished upon thoughts of beauty and truth.

Beauty is in health and life itself, it is in growth. It is the expression of a sound mind in a sound body. Each individual feature and form, attaining its own perfection, makes the perfect woman; but as the rose requires nourishing soil, clear water, pure air and bright sunshine to grow to perfection of form and coloring, so must the body be nourished with proper food, water, air, exercise and sunshine, that it may grow to physical perfection.

The rose has no control over its destiny, in shaping its form or attracting its coloring. This is regulated by a fixed law of nature, but the individual, by reason of his ability to control his thoughts, has the power to change at will the facial lines, allowing beauty of expression to develop from thoughts of love, helpfulness, courage and clearness of insight.

Character expresses itself upon the face and form by the vibration of nerves connected with each thought and emotion; sensations of amusement and good cheer so stimulate certain nerves that the muscles lift, the facial lines expand horizontally and soften perpendicularly; depression, ill-will and discouragement allow the muscles to sag, causing the heavy lines from the corners of the nose to the mouth; thoughts of amusement so lift the muscles from the chin that they change the contour of

the mouth and cause lines to form from the corners of the eyes to the temples. These are examples of the deeper lines, but the lighter lines, invisible to the naked eye, cause the delicate lights and shades, which play upon the countenance, and which we term expression.*

It is the woman of strength and activity who can climb with him, not the woman whom he has to carry, whom man finds the most enjoyable companion. If she be independent and self-dependent, moreover, this strength and vigor are her best capital.

That "beauty is but skin deep" is a pet phrase, fallacious as it is common:—Beauty is health deep. True physical, as well as true spiritual beauty, depends upon the strength at the core, and Nature's unviolable law admits of no lasting beauty of face and expression unless heart, lungs, nerves and the digestive organs are doing efficient work.

We teach children to study the beauty of coloring and form in Nature—in woods, in brook, in mountain, in sea,—in the coloring expressed on canvas, or in the beauty of outline in marble, forgetting to teach them the dignity and beauty of the God-given temple,—the human form,—the soul residence. No more beautiful curves are found in Nature than the curves of the neck, of the chin, of the eye, of the mouth, of the forehead, and no more beautiful lights and shades than in the delicate expression of the mouth, of the hair, the cheek, the teeth, and the sparkle of the eye. The eye expresses not only the lights and shades of the physical but of the spiritual.

Let us learn, first, the beauty and dignity of life which God has given in its integrity in the human being. In a study of the character of great minds in history, let us study the expression of this same greatness in the lines of face and figure of noble men and women about us.

Many women seemingly regard it as a mark of superior

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intellectual or spiritual development to ignore the possibilities within the living, breathing flesh, with its beauty of outline and its susceptibility of being moulded by the impulses of thought. Engrossed in the study of art in the abstract, as expressed in cold paint, or on canvas, or of making themselves useful in the handling of furniture, food, or books, they regard the woman who gives thought to making herself attractive as vain; but if one would be lifted above material drudgery, the artistic sense must be cultivated, and it is only in this attitude of uplift above material form that one puts forth best effort.

The charm of a clear skin, a good figure, abundant hair, bright eyes, dainty hands and feet, and grace and dignity of bearing, are just as much God-given as a clear, strong brain. We train the mind and spirit to express beauty of thought and we should train the body to express this beauty in contour, in lights, in shades and coloring.

Remember always that our use in the world is not alone in catering to the material needs, or to training brains, that our use is to refine, to uplift, to educate both mind and body, and we educate through the eye as well as the ear. The cooking of food is merely an accessory to preserve the body that the soul may have time to develop. The making of clothes and the dusting of furniture foster our aesthetic tastes.

Remember also that the training of the brain depends upon our impulse to right thoughts, and the impulse is also given through the eye.

Presumably each member of the household puts forth an effort to make the evening in which the family is assembled pleasant. The wife, the mother, the sister, or the sweetheart—the home makers—study how best to make the home happy.

The psychological effect upon the mind, when brought into a pleasing atmosphere, is rest to the eye and the

brain, and the tired husband, father, brother or lover may not always tell you what it is that causes the restful sigh of content as he settles down for an evening at home —he may not know. It may have been the freshness of your complexion, the particular softness of your hair, the brightness of the eye, the tinge of Nature's coloring in your cheeks, a rose in your hair, or your rejuvenating spirits; but the eye measures first, and upon his first greeting some psychological effect of pleasure, produced upon the mind through the eye, has put him in a pleasant attitude of mind, upon his very approach to his home, and his whole evening is pleasant in consequence,—it may be his consciousness of your very effort to be attractive to him. This pleasure occurring from day to day, all evenings become pleasant from habit.

One great secret of a happy life for woman is the result of the effort which she makes to please; she thus puts the minds of her family and friends in a receptive mood.

We may put the attributes of spiritual and mental beauty before the attributes of physical attractions, but it is significant to the woman who wants to make the most of herself in life, in the wielding of greatest influence for good, that her attractive personal appearance is her best introduction, and any subject of vital moment broached will fall upon receptive soil if introduced through the pleasurable sensation of the eye.

A woman who is well, strong, happy, well poised and self-possessed, seldom needs be anxious concerning the influence she wields over others; her charm of manner is supreme. Women who are outwardly attractive reach their goal with comparative ease, if their clearness of brain and beauty of mind match their winsome exteriors and manners.

The plain woman, who has so devoted herself to attractive qualities of mind and spirit that she forgets her personal attractions, loses the opportunity of making

the beauty of her mind and spirit felt. Why should a lovely character be required to live within a repellent body, when it is within her power to make the body, with its graces, an index to the soul?

Many women of bright minds and true hearts fail of success in their dealings with others because the picture upon the eye repels and the mind of the listener is in a repellant state—they fail because the outward being does not express their finer sensibilities.

If woman must win her way in the business world, she can have no more sure asset than a wholesome, healthy body with the vibrant sparkle to the eye, winsome manners, glossy hair, well dressed, a clear skin and rosy cheeks.

The woman who is loved spontaneously, not simply because it is a husband's duty to love his wife, but because he just can't help it, is the woman who combines outward graces with inward loveliness.

To love and be loved is woman's inspiration, and no woman can afford to be less than the ideal of husband, brother, sister, father, mother or sweetheart. The best love is the love of the head as well as of the heart, and the sweetest home life is that where the home-maker strives to daily bring some new inspiration or pleasure, not only in the comforts of the house and its material necessities, but in the pleasure and education of the eye and the ear.

The man whose appreciation of the artistic and beautiful is so dull that he is not attracted by a beautiful face and figure is to be pitied. Unless it be accompanied by beauty of character, his attraction may be but transitory, but the woman with beauty of character, beneath the charming exterior, has a marvelous opportunity for the uplift of humanity, and every woman can have the attraction of wholesome health, vivacity of manner, well groomed hair, bright eyes, and a cleanly

body, in which every charm is developed to its fullest capacity.

Teach the eye to be sweetly expressive. There is a deep language of the eye which speaks to soul, not ear. Why should the girl or woman who talks with her eyes be called a flirt?—she is simply making the most of her power of expression and influence—and all influence rightly used for a good purpose is commendable, and why should the law of the eye be confined to the young girl? The mature woman needs to use her fascinations as much as the young.

We are living to develop a soul within ourselves and to aid in the development of others. With this as our prime motive in life, we cannot go far wrong, and is it not our duty to take advantage of every means of influence within our reach and to use it rightly to further our motive? It is when beauty is wrongly used, to attract the baser purposes, that it is deplored.

Let, therefore, no woman be ashamed that she is putting forth every effort to develop, to its best, every physical attraction which God has given her. As we gaze upon dull thin hair, tired eyes, oily skins and wrinkled faces, we may theorize upon the beauty within, but we must make the effort, and our eye turns for rest to the beauty without.

Let no woman say that she is too old to attend to the little accessories necessary to keep herself attractive, and if care or suffering have brought disagreeable lines in face and figure, they can be removed, the muscles of the face made flexible, and the skin elastic, so that the new thoughts of peace, as one relaxes the cares of life, may carve their beautiful outlines.

A face without lines of expression, in one who has lived for sixty or seventy years, is not attractive—but these expressive lines need not deepen into wrinkles. We look for lines which indicate the beauty of thought

and experience in those who have passed the meridian of life, that they may be a guide and an inspiration to those who follow. Then shun not the beauty lines of intelligence, peace and good-will, but keep the skin fresh and elastic, that you may eradicate lines of care and sorrow and prevent the lines from deepening into wrinkles.

No Time.

You say it all takes so much time! What is time for but for development of self and others? Three-quarters of an hour out of twenty-four will serve for the exercise directed to vital organs and nerves, so as to keep them efficient and yourself in vibrant health, to breathing, bathing and the care of hair, eyes, hands and teeth, which means a healthy glow to the skin, a bright eye, a vivacious manner, glossy, abundant hair and all that lends to the outward charm of woman—Is it worth while?

Doubtless among your acquaintances you number friends who always look strong, whose skins are healthy, hair glossy, teeth, nails and hands well cared for, and who spend less time upon themselves than the woman who devotes hours to crimping her hair because it is thin, stiff and dry. The latter spends time and money upon powders and paints to cover a sallow, muddy complexion, which can only be relieved by cleanliness of the vital organs in the activity of the liver, kidneys and intestines; she spends time and money trying to *cover up* defects of face or figure, while the wise woman, who always looks fresh, attends to daily exercise for the vital organs, breathing, bathing and diet. She learns a simple cream which softens her skin in an emergency, but in her intelligence she forms habits of a few daily exercises, that the warm, pure blood may nourish skin, hair and nails from within, and she saves herself hours of time, which the less intelligent, or the woman who has not fixed her habits, spends in trying to cover up imperfections. The wholesome, cleanly, genuine women,

with sound minds, sound bodies, clear discretion, rosy cheeks and sparkling eyes, use their intelligence in the preservation of natural gifts in the formation of hygienic habits, and are thus saved much time in deciding upon this fad or that.

Many a misguided woman begrudges money spent upon an intelligent study of Nature's means for a retention of her innate beauty, but she spends much more upon fads in powders, paints, hair curlers and various nicknacks, which she tries for a day and discards.

Look within—let the strength and cleanliness gained by strong vitals, pure blood, forceful circulation, deep breathing of pure air, reflect upon the surface in a clear skin, rosy cheeks, animated expression and buoyant movements; then be cleanly,—learn the hygienic means of caring for the hair, eyes, nails, skin and feet—form simple habits of eating and living, and you will be saved much time, because when you work you will accomplish, and the toilet accessories in perishable experiments will be reduced to a minimum. Your bathroom will be fitted with articles for cleanliness and your dresser with a simple, harmless cream and a pure powder.

It is the formation of habit which takes time and thought, but when the toilet accessories and conveniences are once adjusted, it takes no longer to use the right article for the toilet than the wrong one; it takes no longer to coil the hair becomingly than unbecomingly—in other words, it takes no longer to be attractive than ugly—when the habit is once formed—and the consciousness that one is at her best has a wonderfully salutary effect upon the temper and the disposition.

Cultivate a habit of being attractive in mind and in body and of trying to please. It is from the positive thought that we grow, not from the negative, and the very feeling of satisfaction that one is at her best spirit-

ually, mentally and physically is one step in the direction of growth.

"If the spirit hath so fair a home,
Good things will strive to dwell within it."
—Shakespeare.

It is far from the purpose here to ask a woman to spend most of her time upon her toilet and to make the outward adornment of her body her chief aim. The motive is not for the art of applied beauty: we are here concerned with a beauty more subtle, more magnetic and far more lasting, that which is the natural endowment of a healthy body. The effort of these pages is to show woman how she can retain beauty of skin, hair, eyes and teeth by merely conforming to Nature's requirements, in the retainment of health of each vital function affecting these outward features.

The suggestion is simply that she give time sufficient for exercise, breathing, bathing and diet to keep her body well oiled and in perfect health, that the outward expression may radiate her inward charm. She is thus more efficient for work and her mind is not constantly digressing from her work to thoughts of physical ailments.

Where one is in comparatively perfect health, the skin of the body white and clear, yet the skin of the face red and blotched, or covered with large pores or blackheads, which have been a result of imperfect health previously, or of the injudicious use of cosmetics, or of atmospheric changes, a good face cream, or pure harmless powder, or a lotion adapted to the particular condition, are helpful in restoring the elacticity, but these should be prescribed by one who has made a thorough study of the skin.

The singular thing is that women of intelligence do not make a more scientific study of the condition which means so much to them. The skin is too delicate to be experimented with, and it is a lamentable fact that the average woman who opens up a beauty parlor spends

little time in the study of physiology and knows less about the ingredients in the lotions which she applies; it is a singular fact also that the average woman who attempts to treat the face uses the same cream and the same skin food for all faces, relying upon the massage and the invigoration of the circulation through the pores of the skin to react sufficiently in case the application is not suited to the individual.

So much is written by newspaper writers, who have not time to go deeply into the science of the matter—they are hired to "fill columns" acceptably—or by this or that beauty specialist who has some ingredient to sell—that one is at sea unless anchored by scientific knowledge.

Every woman should make a careful study of her own requirements, under careful directions—then formulate the plan of treatment best adapted to her individual skin, and follow it from habit—and she should not look for results too soon—they may not be perceptible from day to day, but month by month and year by year will prove her wisdom.

THE SKIN

The care of the skin is a subject quite as important to those who would be well as to those who would be beautiful—it vitally concerns both. Nature's endowment of clearness, rosy warmth and velvety texture are simply expressions of the perfection of action of each vital organ, and the most skilled attempts at producing clear skin and rosy cheeks with paint and pencil are known on the surface as attempts, and urgently deplored, not only because they are artificial, untrue, and savor of the effort *to seem,* rather than *to be,* but because unless used intelligently they are bitter enemies of health.

The skin is composed of the outer Scarf Skin or Epidermis, and the Dermis, or "True Skin," also called the Coreum.

Including both the epidermis and the dermis, the skin varies in thickness from a very thin skin over the eyelids to an eighth of an inch thick where intermittent pressure is applied, as in the palm of the hands and over the soles of the feet. An idea of its thickness may be realized by noting the thickness of the two outer layers of the epidermis, which raise in a blister, yet these layers have been expanded beyond normal size, with the heat causing the blister.

a, epidermis or scarf skin; b, rete mucosum, or rete malpighii; c, papillary layer; d, dermis, coreum or true skin; e, fatty tissue; f, g, h, sweat gland and duct; i, k, hair with its follicle and papilla; l, sebaceous gland.

The Epidermis or Scarf Skin. The outer covering of the Scarf Skin, or Epidermis, consists of four very thin horny or scaly layers. The outer two layers, known as the Cuticle, are firm and close, presenting to the eye a smooth surface, yet, seen under a microscope, the surface resembles fish scales. The cuticle is so thin and flexible, and so lubricated by the natural oils of the body, that only in exceptional cases, such as callouses, is this horny character perceptible; the scales are entirely shed in case

of fever. While the two outer layers are smooth, the inner layers dip down in wave-like undulations over the papillæ of the true skin.

The cuticle is constantly being thrown off and new cells are constantly being formed from beneath; the outer cells of the true skin are daily changed in their composition, growing into the scarf scales and working nearer the surface all the time, until it becomes their turn to be cast off to give place to others forming beneath them.

The Dermis or True Skin.

The True Skin, Coreum, or Dermis, contains the Papillæ, the Blood Vessels, the Lymphatics, the Sebaceous and Sweat Glands and Ducts, the Hair Follicles, the Fat Cells and the Nerves.

When it is realized that all the glands and ducts enumerated are contained in from one-twelfth to one-eighth of an inch, one realizes how tiny these glands are, yet when we consider that the perspiration of one man, in a day, has been known to weigh forty pounds, we also realize how very numerous are the sweat glands, to say nothing of all the other little workers, each and every one performing some important part in building and keeping health.

The true skin is much softer in texture than the scarf skin. It is composed of several layers of fine fibrous tissue and cells arranged side by side like bricks in a wall, the cells being retained in position by a semi-fluid substance which fills the intervening though imperceptible spaces and holds the cells together. The deeper connective tissues gradually pass into the tissues beneath; the intervening spaces between the bundles of tissue are filled with fat cells—excepting the eyelids. In animals, when boiled, the fluid of the true skin forms gelatin.

The cells, especially those in the outer part of the true skin, contain the pigment or coloring matter. Sometimes

this pigment works up into the deepest layer of the scarf skin, as in the negro.

There is a diffused whitish-yellow pigment in the scarf skin which becomes darker in old age.

The pigment diffuses and disappears when one is shielded from light, or kept in a darkened room, but soon reappears when exposed to the light. When it is uniform in all of the cells of the pigment layer, the effect is a uniformly dark appearance, as in the case of the skin of a negro.

The rays of the sun, a mustard plaster or, in fact, heat of any kind, or irritation without heat, will increase the pigment and thus turn the skin dark. This darkening of the skin, as caused by incessant irritation, is shown in the dark lines about a woman's neck, occasioned by tight collars; however, the dark skin may be caused by the dirt being forced into the pores.

From the fact that heat increases the pigment, it might be inferred that a too frequent use of hot water or stream on the face would darken the skin. The furnace man's skin exposed to the heat, though shielded from the light, becomes deeply bronzed. The exposure to intense heat of the rays of the sun for generations has caused the dark complexions of the inhabitants of the tropics.

The pigment is also affected by the character of the blood supply. This has been illustrated by engrafting upon a white man the skin of a negro. The pigmentation is soon lost, while a white man's skin becomes pigmented if engrafted upon a negro.

Generally speaking, the pigment of the skin partakes of the same depth of color as the pigment of the hair and eyes. The skin accompanying dark hair and dark eyes is thicker and darker; that accompanying brown hair and gray eyes is medium in depth and thickness, and the skin accompanying light hair and eyes is thin and contains less pigment. In the latter class, the epidermis

is often so transparent that the blood circulating beneath it imparts a tint of beauty.

Papillae—the Organs of Touch.

Beneath the Epidermis, constituting the outermost part of the true skin is a layer forming undulation like waves called the Papillae. These undulations make a resisting stratum for blows and bring the vitalizing organs nearer the surface.

The papillae are the organs of touch and may be seen with the naked eye in little ridges upon the soles of the feet and the ends of the fingers, which here take a curved direction, conforming to the shape of the fingers.

It is the true skin of the animal which when stripped of the epidermis and the hair is converted into leather and the papillae are readily discernible in the uneven surface, with which we are all familiar, on the inner side of the leather.

Just underneath the papillae is a network, or plexus, of tiny nerve fibres; these have their endings in peculiar little knobs in the ends of the papillae, which make them very sensitive to pressure, touch, temperature and pain.

Nerve ends also extend through the papillae into the cement between the cells of the true skin and the two inner layers of the scarf skin. These nerve extremeties control the circulation at these points, and it will be shown later how they affect the complexion.

The sensitiveness to touch varies greatly with different people and may be cultivated to a very high degree, as is the case with blind people, whose whole existence is guided by this delicate sensation.

Each papilla is supplied with a tiny blood vessel which brings it nourishment. Intermeshed with the nerves about the lower papillae is also a network of tiny blood vessels, the termination of the vessels which supply the skin and carry away its waste.

Fat Cells.

In the deepest layers of the skin tissues are larger cells containing fat globules. Their exist-

ence in normal proportion is essential to health and to beauty, as the fat cells nourish the skin, helping to supply the material for the natural oils, and they form a cushion for its protection. The fat cells, both in the skin and about the tissues, serve as reserve heat and energy. If for a period the body be not supplied with sufficient fat, the fat within these cells is called upon and in cases of starvation, wasting diseases, or all acute diseases attended by loss of tissue, as well as in mental strain or worry, which call for an undue expenditure of mental energy, the fat cells diappear to a greater or lesser extent, particularly about the eyes. The skin in such cases becomes correspondingly flaccid or wrinkled, and the face thin.

Fats may be rubbed into the pores of the skin by first removing the natural oil with alcohol or chloroform and soaking the epidermis with warm water.

Sweat Glands.

The waste matter which it is the office of the skin to eliminate, passes out through the sweat glands, situated in the deeper layers of the true skin or beneath the skin. It is estimated that there are about two and one-half millions of these. These glands coil and twist at their base, resembling somewhat little balls of twine. Ducts, or tiny tubes, reach from the glands to the surface of the skin, opening through trumpet shaped mouths known as pores, which are sometimes visible to the naked eye. The impurities, together with the water from the system, which are exuded from these pores, are known as sweat. The sweat is composed of air, inorganic salts, urea and other waste products. Urea, broadly speaking, represents the proteids of the body. Surrounding each sweat gland is a dense network of capillaries which bring the impurities to the glands for elimination.

The perspiration comes from the lymph spaces, in and about the skin carried to them by the blood.

As a result of extreme heat, beads of sweat are often seen on the body at the opening of the pores.

The other excretory organs are the kidneys, intestines and the lungs, but the kidneys and the sweat glands of the skin collect and eliminate most of the water and the proteid or nitrogenous waste of the system. In normal health the greater proportion of nitrogenous waste is eliminated by the kidneys, but with the skin in thoroughly healthy condition the sweat glands greatly aid the kidneys and relieve them of much of their work.

When the perspiration is increased the amount of urea in the urine is decreased. If these impurities be not eliminated properly, they pass back into the blood and the acids collecting in the system may express themselves in rheumatism or gout; for this reason, vigorous exercise and sweat baths are advisable as relief from rheumatism and gout. In case of inflammatory rheumatism, the odor of the urea, eliminated through the skin, is readily detected.

The water, nitrogenous waste, carbonic acid gas, fatty acids, urea and small quantities of salt which should be eliminated, fluctuate in quantity from 2 to 40 pounds a day. It is said that gas stokers and engineers in the tropics often lose in perspiration from two to three pounds in an hour.

Exercise affects the spinal nerves controlling the sweat glands and the greater the amount of physical exercise, the more the sweat glands accomplish. With but little exercise, as a rule, the kidneys are overloaded because of the failure of the sweat glands to eliminate their share of impurities. In excessive activity in athletics almost all liquid waste is thrown off through the pores of the skin.

Profuse perspiration is always associated with simultaneous dilation of the blood vessels.

Increase of the excretion of sweat occurs in easily

excitable persons in consequence of the irritation of the nerves.

Sebaceous Glands.

The Sebaceous glands, which secrete the natural oils of the skin, are located in the deeper layers of the true skin, though generally not as deep as the sweat glands. They connect with the surface of the skin, as do the sweat glands, by small ducts which open into the hair follicles; they thus become the natural lubricants not only of the roots of the hair, but of the hair itself and they keep the hair soft.

The Sebaceous glands are most frequent about the nose and many of the irritations and pimples upon the face are due to a clogging of these.

The sebum, which is the term designating the contents of these glands, is fluid, but if the ends of the ducts are clogged and the sebum is prevented from discharging naturally, it becomes putrid, hardens and finally forms a white worm-like coil of fat.

If a pore of the face becomes clogged and pressure be applied to either side of the pore, a creamy-like substance will be forced out and the length of this substance as it is squeezed out gives one an idea of the length and size of the glands.

Lanolin is the Sebaceous excretion of sheep, which is obtained from the wool. It forms an admirable basis for ointments and is readily absorbed by the skin.

The excretion of the sebum continuously flows from the glands into the hair channels and continues out to the surface of the skin, where it sears over the surface, actually covering the skin with a thin coating of oil. This secretion is quite different from that of the perspiration and is hardly perceptible, except upon the hair, where it is secreted more freely.

The oil also prevents the water or atmospheric changes from quickly affecting the temperature of the body; it also tends to prevent an undue loss of heat from evapora-

tion. Bathing the skin with grease is adopted by swimmers both to conserve bodily heat and to protect the skin.

Functions of the Skin.

The offices of the skin may be enumerated as:

1. Protection of the surface of the body and protection and support within the body of the inner covering of the internal organs;

2. Elimination of impurities, perspiration and oily matter;

3. Breathing;

4. Receiving sensations;

5. Regulation of the body temperature;

6. Absorption of substances through the pores.

Protection.

That the skin protects the surface, when it is the surface, may seem a contradiction until we recall that the hair and nails are parts of the skin, being mere variations in the form of actual skin tissue. Moreover, the outer skin is especially formed to protect the true skin and its more delicate structures. The skin forming the lining of the digestive tract, the kidneys and the pelvic organs, acts not only as a protection to them, but as a support.

The downy hair which entirely covers the surface of the body is a non-conductor and is its best protection against extremes of heat and cold.

If, upon the approach of winter, one does not cover the body with more clothing than in summer, a very little more clothing will suffice for even the coldest days. The pores of the skin, exposed to fresh air, absorb oxygen, which causes combustion and thus creates heat, and the chemical action of the movements of the oxygen within the body causes the necessary friction for proper stimulation and heat of the nerves.

The construction of the skin, with its system of drainage into the air and its system of absorption of oxygen as a minor lung, with its nerves, dependent upon the air for stimulating friction, would indicate that Nature in-

tended the body to be uncovered or so clothed as to admit of a free circulation of air about it.

For the retention of the heat, fur, feathers, hair and wool, Nature's covering for animals, are the best non-conductors, and thus best conserve the body heat; they are, therefore, the best clothing for the protection of the body against extremes of cold; but linen or cotton should be worn next the skin to absorb the moisture. For this reason, where wool is required to conserve the body heat, if it is not practical to wear linen or cotton under the wool garments, these garments should be made of part wool and part cotton.

Absorption Through the Skin.

The oil from the sebacceous glands which everywhere covers the skin prevents the absorption of water and foreign ingredients, yet under normal conditions a small quantity of oxygen is absorbed from the air.

Where it is desirable that the skin absorb oil as an agency in filling up the fat cells beneath, the natural oil should be removed by alcohol and the face bathed freely in warm water, so as to soak the epidermis and then the oil should be rubbed well into the pores.

An inflamed surface after a blister absorbs very rapidly.

Drugs, such as iodine, which affect the sensory nerves, are sometimes painted over a painful area to diminish pain.

Breathing Through the Skin.

This is demonstrated by enclosing the body in an air tight sac. Remaining there for a time, it will be found that the sac is filled with carbonic acid gas, that nearly all of the oxygen has been extracted from the air within it and absorbed by the body.

It is a singular fact that the skin acts as secondary lungs; the pores of the skin draw in oxygen during the inhalation, as do the lungs and throw off waste during the exhalation. Animals varnished or coated with paint

die very speedily, thus proving the importance of the skin as a breathing organ and heat regulator.

On account of the heat producing agency of the oxygen, the body on the coldest day can be quickly warmed by a succession of full, deep breaths, each breath being held for a few seconds.

The amount of oxygen taken in and the carbonic acid gas thrown off by the skin depends upon the amount of exercise and warmth. When the system is poisoned by carbonic acid gas, if systematic, daily exercise with deep breathing be followed, the pores of the skin will act more freely, the impurities will be eliminated through the sweat glands and the carbonic acid gas will be thrown off, while the oxygen, the vitalizing force, will be absorbed.

A frog breathes through the skin to such an extent that it will live for several days after the lungs have been removed. In man, respiration by means of the skin is more limited than in the frog, owing to the thickness of the dermis.

The necessity of clothing the body so that the air may freely circulate about it will be readily seen. A place for daily exercise, screened from observation, where the body could be nude and exposed to air and light would dispense with many doctors' bills.

Blood Vessels and Lymphatics.

It may be well here to give a little outline of the circulation of the blood and the use and necessity of oxygen within the body, since both a free circulation and sufficient oxygen are most essential to the color, elasticity and health of the skin.

No healing quality nor no nourishment is carried to the skin, excepting through the blood; and no lotion, no oil, no creams, skin food nor prepared condiment possess the same healing nourishing qualities as does pure blood. A wound upon the flesh will heal much quicker if it remains immersed in its own blood. Many skins are un-

dernourished, partly because the blood is impoverished, by a lack of nourishment in the food; partly by the failure of the system to digest or assimilate the food absorbed; partly because the circulation through the capillaries and small blood vessels of the skin is retarded; or because of insufficient breathing, hence insufficient oxygen to purify the blood.

No amount of oils or nourishing lotions applied to the skin can take the place of a thorough circulation of good blood to it. It is here that massage, which opens each capillary in the skin of the face, and exercise, which brings a thorough circulation of blood throughout the body, together with breathing of sufficient pure oxygen affects the complexion. Exercise should be accompanied by a diet adapted to each individual condition.

The blood capillaries spread themselves over and through all the tissues of the body until in the skin, for instance, they form a regular network around and about every fibre. They are so close that it would be impossible to prick the skin with the finest needle at any point without puncturing a capillary and thus drawing blood. The walls of the capillaries are very thin, so thin that the oxygen and the nourishing qualities of the blood ooze out into the lymph spaces. Here the nourishing qualities feed the tissues and the oxygen causes combustion of the waste; the impure gases re-enter the capillaries and then the veins. Other impure waste matter which cannot re-enter the capillaries is picked up by the lymph spaces and carried by the lymphatics into the venous stream.

The white liquid which exudes from a wound upon pricking the skin or from a sore is lymph.

Thus the blood, obtaining nourishment from the food and oxygen from the air completely reaches the skin

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The lecture of this series upon "The Circulatory System" traces the circulation of the blood in its journey as it carries nourishment out to the capillaries of the skin and its return circulation, laden with impurities, back to the lungs, showing just how the blood nourishes the tissues.

and every part of the organism, carrying its nourishment and vitalizing power to the very extremities. Some idea of the waste which is continuously thrown from the system may be realized by comparing the color of the impure, venous blood with the color of the pure arterial blood containing the oxygen. It must be recalled that the dark, impure blood in the veins is constantly being purified in the lungs and that much waste must be constantly picked up to keep its dark hue.

The relation between the condition of the blood and the character of nourishment which it, therefore, brings to the skin will be readily seen.

If the digestive organs are weak, so that the food is not put in proper condition to be absorbed or if there is an insufficient activity of the body tissues to insure complete assimilation—conversion of nourishment into body tissue—or if sufficient oxygen is not taken in to assist in katabolism—a breaking down of the waste tissue of the body—the blood lacks nourishment and the skin must suffer, as does the rest of the body.

Elimination of Waste.

If the liver, kidneys, intestines or lungs are not throwing off the amount of waste designated by Nature for them to eliminate, or if the combustion of this waste is not carried on out among the tissues, the blood becomes impure, and the skin, being one of the organs of elimination, is forced to throw off more than it should, or throw off impurities which are not consistent with the character of impurities which Nature intended to be thrown off by it.

No agency, except the circulation of blood, is so important in this elimination, as full breathing of pure air. If the breathing is not deep, so that every capillary of the lungs is expanded, that sufficient oxygen may enter them, the blood is not fully purified as it passes through the lungs, and the proper amount of oxygen does not

*PUBLISHERS' NOTE: For complete treatment of the purpose and construction of the lymph circulation see p. 13 of the Circulatory System, by Susanna Cocroft.

enter it. Thus it is that the blood gradually becomes impure as the result of insufficient breathing.

As the oxygen enters the blood, it causes a combustion of the waste products in the form of carbonic acid gas, phosphoric acid, acid potassium phosphate and glycerin-phosphoric acid, which readily pass off from the blood through the lungs. Waste products are being thrown off every instant in all parts of the system. As the tissues decompose, the oxygen, as it is carried by the blood out among these tissues, puts them in condition to be absorbed by the lymph-spaces and the veins, which carry them to the lungs and to the skin, where they are ejected from the body.

The experience of the writer in taking the measurements of twenty-five thousand women has unfortunately shown that the average woman takes in not over two-thirds of the oxygen necessary for complete purification.

The importance of full, correct breathing and of the strength of the stomach, liver, kidneys and intestines, as agencies in the retention of a clear, smooth skin, cannot be over-estimated.

The reader will recall that in order that the food may be digested, absorbed and converted into tissue, and the waste of the system put in condition to be cast off, a regular heat must be kept up within the body. It will be recalled, also, that the heat is caused by the combustion of carbon.* As is the case in the combustion of carbon in wood, the more oxygen supplied to the fire by fanning, or by draughts in a stove, the more combustion and the greater the heat. If all air, and therefore, all oxygen be kept away from a burning fire, the fire will go out, because the combustion will cease when the oxygen is withdrawn. This same combustion of carbon, or fat, goes on within the body to

PUBLISHERS' NOTE: See lecture upon Poise, Obesity and Leanness by Susanna Cocroft.

keep up its heat, and, if all oxygen be withdrawn from the body, it grows cold and death ensues. The importance of full breathing to carry oxygen to all parts of the body as a heat producer, will, therefore, be readily seen.

The friction created by the passage of the oxygen about all of the tissues, together with the friction created by the passage of the gas, gives the heat and stimulus necessary to the flow of the electric current through the nerves. It is in the creation of this friction that the oxygen of the air is necessary as a nerve stimulus. Without this natural stimulus, the nerves do not properly direct the muscular action, necessary, not only to move the extremities, but to move all tissues which aid in digestion, absorption and assimilation of foods and to relief of the waste.

Effect of Nerves Upon the Skin.

Through the telegraph system of nerves, the brain receives messages and issues its instructions to all parts, regulating the action of the muscular coats of the blood-vessels, as well as of all other tissues.

The body contains two kinds of muscular tissue: the one obeys our thoughts, directed through the nerves, by will, as is the case with the large muscles of the body; and the other, as the tissues in the blood-vessels, obeys our emotions and not our thoughts; thus, the muscles of the arms can be moved at will, but those of the blood-vessels are controlled only by thoughts and emotions, directed by the delicate vaso-motor nerves.

The involuntary muscles of the capillaries being elastic, by some emotions dilate, and allow the blood to flow freely, giving the red glow to the skin, or by other emotional impulses, they contract, forcing the blood out and the skin blanches or turns pale,—thus an emotion can contract the blood-vessels and blanch the cheeks, or by opening them can diffuse the face with a blush.

It is the contraction of the involuntary muscles in the capillaries of the skin, which causes the peculiar expression known as "Goose flesh."

If one becomes extremely angry, the minute capillaries contract, the blood flows out of them and is sent bounding back to the large arteries and through them to the heart and brain. This sudden reversing of the blood-current is unnatural; it produces unpleasant sensations and thus extreme anger often causes severe illness.

Extreme fear acts in the same way, and the effect upon the health of frightening children as a means of punishment, will be readily seen.

It must be borne in mind that when a thought contracts the capillaries of the outer skin, it contracts also the skin which lines the stomach, intestines, and, in fact, the lining of all internal organs; hence fear, anger, worry or displeasure directly affect the stomach, intestines, kidneys, and, in fact, all of the vital organs; and the skin, as well as the tissues of the nerves and every part of the body, become insufficiently nourished. Long-continued worry, displeasure or anger, by their effect upon the nerves, so interferes with the assimilation and absorption of nourishment that the reserve fat, stored in the system, is consumed and the body becomes thin.

It is probably because of the damaging effect of such thoughts upon the body that they have been termed unpleasant thoughts.

Thoughts of kindness, joy, happiness and good-will, put the nerves in a normal condition and it is through this control of the blood-vessels of the body, through the nerves, that the health is materially and directly affected by the character of thoughts. This physiological truth is the basis of the so-called "Mental Science" belief.

Disagreeable thoughts, resulting in unpleasant emotions, if persisted in for a long time, keep the capillaries of the skin contracted, drive the blood from it, and the skin becomes undernourished and pale.

If one worries for a few days, causing unpleasant emotions, the complexion often becomes pale, because the nerves to the capillaries of the skin have contracted and kept from flushing with blood. Illness, causing nerve tension, sometimes acts in the same way,—even when there is sufficient blood in the body, the face is pale. Perhaps one of the most frequent causes for pale faces is worry. *Thus do our thoughts affect our complexions.*

Regulation of Temperature.

The skin, with the other organs of excretion, is an important regulator of the heat of the body. As previously stated, heat is occasioned by combustion, within the body, of the elements contained in the food as they are changed by chemical action into other forms and combinations, also by friction in the passage of solids, liquids and gases through the blood.

The heat is distributed throughout the body by means of the blood. The normal temperature of the body is a little over 98 degrees.

Much of the heat passes off from the body in aqueous vapor and volatile matter through the lungs and the skin. About 90 per cent. of the so-called "solid food" leaves the body in the form of carbonic acid, water and urea. These, in part, all pass through the skin. The perspiration, and the aqueous vapor carry body heat out with them, thus cooling the body and regulating the temperature, and it is very necessary that the flow of perspiration be kept free and natural.

In the condition of the body termed a "cold," the pores of the skin, or the opening of the sweat-ducts, are closed, the impurities cannot be eliminated and the poisonous toxins remain within the body. The kidneys and intestines are forced to eliminate the proportion of waste which should be thrown from the skin. The relief, therefore, from a cold must be in opening the pores. The greater heat which aids in opening them may be occasioned by imbibing much oxygen. Therefore, deep breathing and our grandmothers' remedy of a hot bath,

a hot drink and a warm covering in bed is a most rational means of opening up the sweat-glands and relieving a cold.

What the body would be were there no means of parting with its heat, excepting by dry radiation through the skin, is seen in fevers where the perspiration which should be evaporated is suppressed, and the blood becoming overheated burns the epidermis. Great heat can be borne as long as the circulation is vigorous and the skin clean, so that the sweating is free.

The greater the evaporation, the greater the loss of heat, so that in cases of fever, if the sweat ducts can be opened, the temperature is lowered. It would thus seem that the application of hot water, which would tend to open the pores of the skin, would assist the natural heat evaporation through perspiration, in fever patients, and be productive of more permanent results than can be obtained by the application of cold water, because water incites greater metabolic activity which creates heat.

The nerves are also an important factor in the regulation of body heat, and in controlling the involuntary muscles in the blood-vessels; where the circulation is sluggish, the work of the physical culturist should often be directed to the toning and relaxing the nerves.

Pimples

That the waste may not be clogged and the gases remain in the system, nor the kidneys and intestines be overloaded in their efforts to eliminate the proportion of waste which should be carried off by the skin, the pores of the skin must be kept open.

If the pores are clogged; or if there is more waste than the skin can eliminate, by reason of overeating, or of eating food too rich, or productive of too much gas, or if the failure to eliminate through the glands continues for long, the tissues become involved, the circulation at that point is interrupted, the capillaries are broken, and pimples or skin eruptions result.

Temporary relief may be obtained by the application

of a lubricant which soothes the irritated nerves and assists in re-establishing the circulation through the injured capillaries, but the only permanent relief comes in establishing a perfect activity and a good circulation throughout the entire body, that the waste may be relieved through natural channels.

Constipation is a prolific source of skin eruptions. The excretions, failing of natural relief, form gases, which are carried into the circulation and attempt to relieve themselves through the skin and kidneys. These impurities contaminate the blood, and there is no more prolific cause for pimples, boils, cancers, tumors, or other blood diseases than inactivity of the intestines.

Blackheads. Blackheads occur where the ends of the sebaceous ducts or pores of the skin become clogged with dirt. The matter in the sebaceous ducts becomes cheese-like, as when clogged for any other reason. They can be relieved by thorough cleanliness and massage.

Large Pores. Large pores are caused by the clogging of the sebaceous ducts with dirt, powder, or with anything which causes a hardening of the sebum attended by an inelastic skin, which does not close the pores when the clogging is removed. They are best relieved by massage, which keeps the skin elastic, and by cleanliness, which does not allow them to become stopped up. An astringent wash may be applied where the pores have become enlarged; but care in the selection of a wash must be exercised and the skin must be thoroughly cleansed before it is applied.

Red Faces. There is a difference between rosy cheeks and what are commonly termed "red faces." The latter are occasioned by an unusual dilation of the capillaries of the skin. The capillaries sometimes become distended by wearing too tight clothing. The condition can be corrected by establishing, through exercise, a uniform circulation throughout the body, by the use of cold

water baths, and of an astringent wash for the face, which causes the distended capillaries to contract.

Pale Faces. Pale Faces may be occasioned by deficiency of blood supply; by a deficiency of red-blood corpuscles; or by an undue tension of nerves, which causes the capillaries to contract, so that the blood cannot enter them. The relief from the latter is in nerve relaxation and of the former in exercise for deep breathing, forceful circulation and proper diet to build up the blood. Worry, or disagreeable thoughts, by reason of their effect upon the capillaries, are a most frequent cause of pale faces.

Sallow Skins. Sallow skins are usually caused by the failure of the liver to properly discharge the bile; it then becomes absorbed by the blood stream and shows itself in the yellow tinge of the skin. If the bile is clogged almost completely the result is jaundice. There are many mild forms of jaundice in those who consider themselves practically well, the only expression being in dullness of mental perception, general lassitude, or sallow complexion. Constipation, which causes the bile and other impurities to remain in the system, also causes sallow complexions. The relief clearly must be in exercise directed to the vital organs, to create a normal activity of the liver and intestines.

Acne. Acne is a very common, usually chronic, disease of the sebaceous glands occurring in the form of pimples mostly about the face, chest and back. It occurs usually between the ages of 16 and 24 years and is associated with menstrual and gastro-intestinal troubles or with anaemia. Sulphur sublimatum, applied outwardly, helps, but does not cure. The relief is in strengthening the uterine disorder, correcting the anaemia or strengthening the stomach and intestines. The bowels must be kept active.

Eczema, Tetter or Salt Rheum.

Eczema, tetter or salt rheum, is an acute chronic, non-contagious, catarrhal inflammation of the skin. The skin is reddened in spots, the redness shading off insensibly into the unaffected skin. Eczema occurs usually in thin skins, which are particularly susceptible to the action of external irritants. It may be caused by improper food, gastro-intestinal disorders, deficient urination, vaccination, poison or prolonged hot fomentations. The relief must be in the removal of the cause and attention to the general health. If constipation exists it should at once be relieved.

We are prone to treat local affections of the skin by local remedies, overlooking the principal cause of skin blemishes due to nutritive disorders of internal organs. The blood and lymph circulation in the skin is governed by a forceful circulation throughout the entire body, as well as by the condition of the heart and the nerves. We possess remedies which, temporarily, allay local irritation, but for the permanent relief the cause must be reached.

It will be readily seen, then, that clearness of complexion and freedom from skin blemishes depend not only upon the normal activity within the skin itself, and the assimilation of the food within the tissues, but upon the normal activity of the stomach, liver, intestines, lungs, kidneys and the nerves.

For clearness and freedom of mental as well as physical action, the system must be kept free of waste. This cleanliness within the body is even more important than cleanliness of the surface. It is a far more imperative duty to keep the sewerage system of the body clean, and all refuse removed, than to keep the sewerage of the house or the city clean. The same putrefaction and infection which result from refuse matter collecting about the house, result within the body, yet many a well-meaning woman is so engrossed in her household cleanliness

that she forgets the cleanliness within herself. She spends far more time and money in the study of household economics than in the cleanliness of the house in which her soul abides. She cares for the surface of the body, but it is an unfailing law of Nature that cleanliness or weakness within expresses itself upon the surface; either in flabby or too tense muscles, in blemished or unnourished skin, in lines of physical suffering or in sluggish physical movement or mental torpor. The cleanliness within results from daily exercise for the vital organs and nerve centers which keeps them active —when active they are self-cleansing.

Fatigue. By reason of the fact that the fatigue of the body very quickly and definitely affects the condition of the skin, the reader is respectfully referred to page 19 in my lecture upon Foods, for a full description of the body in the state termed "tired."

If a muscle is fatigued, a greater nerve stimulation is required to incite its action, thus, where one is tired, more nerve force is required to stimulate the muscles and the nerves become overtaxed. Artificial nerve stimulation may be applied, but from this there must be a reaction.

The only natural relief from fatigue is in exercise to call a vigorous circulation to all parts of the body, deep breathing and relaxation until the waste is removed and harmony is restored.

Wrinkles. Wrinkles are caused by frequent muscular contractions which continuously crease the epidermis and crowd the papillæ of the true skin together in the direction of the muscular tissue. drawing the epidermis, which dips down in waves over the papillæ, with it. If continued for long and the skin is inelastic, so that it does not contract, the epidermis is drawn as deep as the muscular tissues and wrinkles result. These tissues can be brought back to normal condition and the papillæ, which have been crowded aside, developed. As the epi-

dermis is being shed constantly, the new skin, growing from beneath, can gradually partake of its original elasticity and smoothness, if the cause be relieved by the right treatment; but it must be borne in mind that wrinkles cannot be relieved, if the thought which is continually forming them be persisted in, because this thought will undo all that daily massage can do.

The permanence of wrinkles depends upon the elasticity of the skin. This elasticity is regained by a circulation of good blood through the skin, which thoroughly nourishes the tissues making them elastic; by the change of thought which relaxes the nerves to the wrinkle, and by the development of the papillæ and of sufficient fatty globules beneath the skin to supply its natural cushion.

All capillaries, glands, nerves and tissues of the skin can therefore be put in normal condition by attention to the health which brings good blood, by toning and relaxing the nerves and by attention to regular massage movements for the face which keep the normal circulation and elasticity.

Dry, poorly nourished skin, which has lost its elasticity, wrinkles most easily. The nerves must be strengthened so that they are not continually interfering with the nourishment of the skin. It must be remembered that it is much easier to prevent than to remove wrinkles and that it requires patience and perseverance in the following of a very few simple laws of massage, in cleanliness and the healing of tissues.

Any woman can attend to her own face quite as well as the masseuse can attend to it, by intelligent study of a few movements which will provide good circulation and develop tissues, but this work must be done intelligently, or the lines will deepen.

Work upon the face should be pursued a few minutes daily—once a week at the massage parlors will not accomplish the result which five minutes daily before your

mirror will do. The greatest care should be observed in the use of water, brushes, skin foods, cream and powder.

Massage.

Massage movements stimulate the nerves of the skin, but their chief value is in stimulating the blood and lymph circulation, thus encouraging the flow of pure blood for nourishment and removal of waste products.

Massage for the face, therefore, is quite as necessary as exercise is for the body. One reason that the faces of men are more ruddy, and the facial muscles more firm, is because in the regular shaving of the hair from the face, the circulation is quickened, the glands of the face are exercised by the movement of the hairs and the muscles receive a massage.

There are a few people who have so schooled themselves that they can control the movement of the face at will, when the nerves are under the force of any strong emotion, but all of the massage parlors and all of the face creams in existence cannot permanently remove lines from the face, if the thoughts and emotions which made those lines be persisted in. This brings us back to the same starting-point—that no one can do for the individual what Nature intended the individual to do for himself: viz.: — the use of the God-given intelligence to *keep* in perfect health and in the perfection of each physical charm.

THE HAIR

Almost the entire surface of the skin is covered with hair, the chief exceptions being the eyelids, the palm of the hand and the sole of the foot. The bulbous root of each hair rests upon and around a papilla. The channel through which the hair grows to the surface is lined with

little cells, which form a lining membrane, or a duct, about it; into each hair-duct is poured the contents of the sebaceous glands, which keep it oiled and soft. If the hair is brittle or not fully nourished, the oily secretions may be increased and the nerves and blood-vessels, with which each hair-follicle is supplied, may be stimulated by properly applied massage.

"The hair consists of (1) the Marrow or Medulla, which is absent in wooly hair or in the hairs found during the first year of life; (2) outside of this is the thicker Cortex, which consists of rigid, horny, fibrous cells,—in and between these cells are the Pigment granules of the hair; (3) the Cuticle or the covering of the hair, which consists of horny layers extending toward the end of the hair. In brushing the hair from the root downward these horny layers are stroked—in brushing upward toward the roots, as in matting the hair, they are fluffed and broken.

Upon being burned, hairs yield 5-70 per 1000 of ash, composed of 250 alkaline sulphates, 150 calcium sulphate, 100 iron oxide, and 400 parts of silicic acid. Dark hair, as a rule, yields more iron than blonde hair. On boiling hairs with alkalies sulphur is liberated."

The black or brown color of hair is due to melanin. There seem to be several varieties of this pigment, that of human hair containing less nitrogen and more sulphur than some of the others. It contains no iron.

Gray hair indicates defective formation of pigment. "The silvery appearance of white hair is increased when small air cavities are developed, especially in the medulla, and to a less extent in the cortex where they reflect the light." Cases have been recorded, where, in case of extreme nerve disturbance, the hair has turned gray in a single night, due to air cavities developing in the marrow.

The hair is highly elastic, stretching to 33 per cent. of its length.

Hair grows from an increase of the cells in the root, upon the surface of the papilla, these cells representing the matrix of the hair; as layer after layer is formed, the hair is raised higher within its follicle. When it reaches its full growth it is gradually lifted up from the papilla and falls out, a new hair forming from the same papilla.

There would seem to be no physiological basis for the statement that the pulling out of one gray hair will cause more to grow. It, however, is unnatural to remove hair by force.

Hair in normal health will grow about four inches a year, if properly cared for.

Singeing the hair is based upon the fallacy that the hair is provided with blood-vessels, which bleed when cut; this is not true — the hair shaft is composed of closely packed cells. Owing to its cellular structure it is capable of absorbing moisture, and air sometimes penetrates the intercellular spaces, causing the hair to split.

Since the growth of the hair is from the root, and since it receives its nourishment from the root, it will be readily seen that all efforts to promote its growth and strength must be directed to the scalp.

The scalp should never be treated harshly, as by scraping with a fine-tooth comb or stiff brush. Mothers make a great mistake in removing the scarf skin of a child with a comb; it forms more rapidly when treated harshly.

The chief requirements for the hair are pure blood and a free circulation about the hair-follicles. This means a good activity of the true skin, in the freedom of the capillaries and nerves, and all of the hair tonics and hair growers in existence will not take the place of nourishing blood. It must be borne in mind that all substance or food to build hair, or any body tissue, is carried through the blood and whatever causes an impoverished condition of the blood must affect each part—also that the nerves have the power to contract the capillary walls

—see page 30—thus preventing the blood from entering them, so that those who wish well-nourished, glossy, abundant hair, must first attend to the condition of the nerves, to the general circulation and to the blood. The massage required to rub hair tonics into the scalp, by bringing a good circulation to the true skin, is more salutary than the tonic.

As long as the hair-follicle is in a healthy condition, it will produce more hair-bulbs and new hairs will grow, but the activity of the bulb is weakened by impoverished blood and weakened nerves, just as every other part of the skin is weakened. Stimulating ointments may be applied, but their effect is transitory unless the cause, in blood and nerves, be removed.

Eczema, tetter and salt rheum in the hair are skin diseases and require special treatment.

Every healthy head of hair has some dandruff on it, but much dandruff is a sign of disease.

There is no tonic for the hair equal to daily exercise for the vital organs to encourage proper nutrition, exercise to relieve congested nerve-centers and deep breathing to encourage purifying oxygen.

Overstrenuous nerves and habits of worry affect the amount of pigment in the skin and the hair. In cases of extreme neuralgia of the head the pigment is so affected that the hair grows gray in patches. In such event, the color is sometimes restored when the pain is removed.

In some affections of the skin of the scalp, the corium becomes contracted, the nerves are pressed upon and the root of each hair seems sore to the touch. An ointment well rubbed into the scalp to relieve the contraction is salutary.

The nerves to the scalp have their directing centers in the medulla oblongata and any exercise for this part, or heat applied for relief of nerve tension here brings relief from this tension.

Daily massage for the scalp in invaluable and with a little direction each woman can massage her own scalp; three minutes given to this each morning are more effective than a half-hour once a week at the hair dresser's.

There are no means of restoring gray hair through a natural process, excepting relaxation of nerve tension, where illness has turned the hair suddenly, but the gray hairs can long be delayed by attention to the blood, nerves and general health and by daily massage of the scalp—massage is far more effective than brushing the hair, and, as stated above, it takes but a few intelligent directions to learn how to do it oneself.

It is much easier to prevent hair from falling out, or to stop it turning gray, than to correct the difficulty.

Baldness. Where total loss of hair takes place, it is due to a diseased condition of the scalp and does not come within the scope of this lecture.

The cause of loss of hair in old age is due to the circulation becoming weaker and not thoroughly nourishing the hair follicles, also to a general weakness of the nerves. The premature loss of hair is more common with men than with women, due partially to the frequent wetting of the scalp and to the severe brushing with a pair of stiff brushes, as well as to the habit of wearing hats too constantly, which admit of slight ventilation. It is occasioned sometimes by working over a light. Fevers or inflammation of either nerves or tissues predispose to baldness.

Air, sunshine, light and a good circulation of nourishing blood are the sine qua non of thick glossy hair.

The custom adopted in some countries of going without head covering is tending to develop a rich growth of hair.

The hat most frequently worn by men encases the head too tightly, interfering with the circulation. The two temporal arteries supplying the upper and middle portion of the head pass to it in front of the ears; thus

when the hat is worn tightly on the head the blood supply to the scalp is limited and the skin becomes overheated. Anything which tends to undue heating of the scalp is detrimental to the hair.

BATHING

Where one is doing vigorous manual labor, the pores of the skin are kept well open by the excretions from the sebaceous glands and by the perspiration; the friction of the clothing removes the waste and the loose epidermis, so that for the laborer the daily bath is not as necessary as for one of more sedentary habits.

In normal health, the average individual will keep in most vigorous strength by a cold plunge each morning, followed by a brisk rub with a coarse towel or a flesh brush, and a warm soap bath once a week.

The pores of the skin are only partially self-cleansing, —that is, they will free themselves, if no impediment obstructs them, and the loose, scarf skin, the perspiration or oily matter, together with the dust and dirt from the air, if not removed by friction, will so clog the pores that the waste will not be eliminated and the impurities will be absorbed by the system, as previously explained.

Cold baths, given when the individual is sufficiently strong to react from them, have a wonderfully toning effect upon the nerves. One should accustom himself to the cold bath gradually, beginning with tepid water, decreasing the warmth until one welcomes rather than dreads the cold. In these days of clothing the body until the skin is constantly warm and thus weakened, it is most desirable that all who react, should accustom themselves to it. The cold water awakens a vibrant nerve force; the sudden cooling of the blood causes a

contraction of the capillaries and small arteries by stopping the circulation through them, and the deeper circulation about the vital organs is increased as the blood is driven from the surface to the larger and deeper arteries. This is but for a second, however—having gained heat, the blood then returns to the skin with a strong, flushing force, the capillaries are fully distended and the skin warm.

The cold bath is much more desirable in winter than in summer, because of the increased respiration and the consequent increase of oxygen, as well as the increased circulation and metabolic activity; the reaction is heating. The pores of the skin are so strengthened and accustomed to the cold that it is one of the most effective agencies in the prevention of the condition we call a "cold."

Those who have steadily and judiciously persevered in accustoming themselves to the cold bath alone know its tonic and rejuvenating effects and how easily the system becomes accustomed to the coldest water and to changes in temperature. About 77 degrees F. constitutes the temperature for a cold bath for most persons.

The cold bath, by its invigoration, furnishes the stimulus to take more exercise and is thus particularly desirable for those whose circulation is sluggish.

Hot baths are remedial and are desirable only in case of disease where it is desirable to create an abnormal perspiration to rest the kidneys—they should be prescribed by a physician.

In the application of hot and cold water it must be remembered that the reaction from a warm or hot bath is cooling. The first effect is to increase the body heat, but by leaving the pores open, the reaction is to diminish the body heat by radiation and perspiration, so that the after effect is cooling. It decreases respiration and thus less oxygen is taken to cause body heat. Thus warm baths are best taken in summer.

The warm bath soothes and relaxes overstrenuous

nerves and is, therefore, desirable, just before retiring, for nervous, excitable temperaments or for those overfatigued by any violent effort—such nerves gain elasticity, however, in the reaction from a cool bath.

A warm bath may be said to range from the body heat 98 degrees F. to 101 degrees F., yet what is hot for one may not be so for another. If the respiration becomes frequent or deep, and the perspiration profuse, the bath for that person is hot and should be used with as great caution as should the cold bath with others; it should be indulged in at the most but a few minutes. Hot baths are powerful stimulants and, by reflex action, they overstimulate the heart and blood vessels.

The reason that both hot and cold baths are refreshing, when tired, is because of the heat applied—the hot bath by the mechanical heat applied and the cold by more oxygen and quickened circulation—the waste of the system is more quickly relieved.

THE TEETH

White and well-kept teeth will redeem an otherwise plain face; while neglected, discolored or misshapen teeth will mar a most beautiful one,—will distort the most radiant smile.

The features contributing the greatest amount of expression to the human face are the eyes and the mouth; unless the teeth are attractive and well cared for, the beauty of an expressive mouth is greatly lessened. Furthermore, the habitual neglect of the teeth, together with the resultant bad breath, renders an otherwise pleasing face repulsive to those of cleanly tastes and habits, and is most detrimental to the health.

The teeth are simply papillæ, or conic eminences of

the mucous membrane of the gum, which have passed through characteristic development.

The portion of the tooth above the gum is known as the crown, the portion imbedded in the gum as the fang, or root, the part connecting the crown and the fang, as the neck.

In structure, a tooth consists of enamel, dentine and pulp. The enamel is the epithelium of the papillæ and the dentine, which is surrounded by cement, the connective tissue. The hard enamel encases the crown of the tooth; the dentine, within the enamel, constitutes the interior crown and the whole of the root, while the pulp, which is a bulbous prolongation of the mucosa of the gums, is traversed by blood vessels and nerve filaments.

The enamel is the hardest substance in the body. It consists of hexagonal flattened prisms, arranged side by side like a palisade.

The dentine surrounds the pulp-cavity, and the canal of the fang. It is ivory, very firm, elastic and brittle in character. Innumerable long, tortuous, wavy tubes—dentinal tubules—permeate it, each tube communicating with the pulp-cavity through the medium of a fine opening, which passes more or less horizontally outward to the outer layers of the dentine.

It is difficult to give teeth that are crowded thorough care. This condition is sometimes the result of inherited tendencies, the teeth being too large in proportion to the length of the jaws; consequently they are forced out of line and crowded against each other. Defects of this kind sometimes result from the habit of mouth-breathing, a practice that usually follows obstruction to the nasal passages through excessive use of the adenoid tissue in the vault of the pharynx.

The above deformity consists in a narrowing of the hard palate, and the maxillary arch, to such an extent that the line of the incisor teeth above, project beyond the line of the lower incisors. In such case, the lower

jaw is apt to recede, thereby disturbing the symmetry of the face. The habit of breathing through the mouth, therefore, may alter the contour of the entire face.

The habit of thumb-sucking in childhood leads to a similar deformity; the habit of breathing through the mouth is commonly associated with that of thumb-sucking. If mothers understood that teeth, not growing evenly, or that the habit of thumb-sucking would each cause a defect in the face by the protrusion or receding of the lower jaw, they would give the teeth of the child more careful consideration.

No matter what the cause, habitual breathing through the mouth leads to the accumulation of organic matter about the teeth and hence favors the destruction of dentine.

It may be observed that certain families, through several generations, have soft or feeble teeth, apparently due to some congenital disturbance in the nutrition of the parts, but inherited tendencies can be corrected. It is generally conceded that with such individuals much more care is necessary to prevent the development of caries.

Observation has established the fact that teeth, the least called upon for mastication, are often the most delicate. Healthy individuals, who use their teeth somewhat severely, apparently have a better innervation and blood supply.

A like dissimilarity may be observed in the integument of people and may be accounted for by assuming that this depends upon some peculiarity in nutrition.

The old theory that the teeth are injuriously affected by the action of certain acids found in the stomach is losing credence. One authority advances the belief that caries are the result of lactic acid produced by the growth of certain bacteria about the teeth. He bases his opinion upon the fact that he found more than one hundred varieties of micro-organisms that grew in the

mouth or about the teeth. That bacteria are in some way responsible for dental caries seems to be a generally accepted fact. There is a growing doubt, however, as to lactic or other acids playing any special part in the process. It is undoubtedly safe to assume that to bacteria dental decay is attributable; the natural resistance of the teeth playing but a subordinate part; and so long as the diet is nutritious it has no influence whatever.

Fragments of food, together with the secretions of the mouth, finding lodgment between and around the teeth, afford ample opportunity for the growth and development of bacteria.

According to general belief micro-organisms are concerned in the formation and discoloration of tartar, which is both disfiguring to the teeth and injurious to the gums. However, teeth are attacked and cavities formed without the development of tartar. All that seems necessary in this work of destruction is for the organism to lodge in some protected place, beyond the reach of the tooth-brush or other toilet articles commonly used to dislodge them.

A catarrhal condition about the margin of the gums leads to their recession. Bacteria is largely the cause of this catarrhal condition, yet the condition is much favored by the irritation of acid foods, by the presence of tartar, also by carelessness in the use of tooth-brushes, tooth-picks, etc.

Summarizing:—as far as established knowledge upon the subject goes, the preservation of the teeth resolves itself into a few simple principles, viz.: The prevention of overcrowding; the avoidance of chemical or mechanical injury to the teeth and gums; the careful and frequent cleansing of all the exposed surfaces of the teeth, and the use of such harmless antiseptics as will prevent the long continuance of pathogenic bacteria in the mouth.

The important part that teeth play in digestion is not

fully recognized. Chronic indigestion very often arises from imperfect mastication, owing to faulty dentition. It is of the utmost importance in such cases to have decayed teeth filled, and, in case there are many missing teeth, they should be replaced by artificial ones; else medication and dietary regulations may be of little avail.

Children should be trained at an early age to use the tooth brush, and cavities appearing in their temporary teeth should receive prompt attention. Should the teeth of the upper jaw decay before the teeth of the lower jaw, they should not be extracted, but filled, for if they are extracted for a length of time before the permanent teeth appear, the upper jaw is likely to develop faster than the lower, or vice versa,—hence the projecting teeth so disfiguring.

Teeth extracted, allowing the gums to recede, change the contour not only of the cheek, allowing it to sink, but the sinking of the cheek allows the muscles of the lower face to sag and to draw down the corners of the mouth, making the drooping lines which give an expression of discouragement and otherwise change the entire expression of the mouth and the face.

FEET, HANDS AND NAILS

Hands and Nails.

The hands are an important medium of character expression, and in races that gesticulate a great deal, particularly the French, the hands express much of the temperament,—the play of thoughts, and the hidden depths that the face, schooled to control, does not. This may be partly due to the fact that most sensitive and delicate nerves extend to the palms and finger tips. These nerves can become so sensitized, as is the case with many physicians, that they have learned to use them as a diagnostic aid in their profession.

The nerves in the palms of the hand are very sensitive and the sweat glands profuse, so that the palm of the hand is often a prime symptom of the general condition of the system. Low vitality and slight resistive force often express themselves in a cold perspiration in the palms. The clasp of such a hand is disagreeable and clammy.

A vast amount of character is expressed by a hand-clasp, and if the face is studied, in conjunction with the hand, corresponding lines of weakness or strength may be discovered. A firm hand is designated as a positive hand. The negative hand is limp and unresponsive, denoting more or less weakness of character. The artistic hand is sensitive, and may be either positive or negative, but is always expressive of the artistic temperament.

Nothing detracts more from one's appearance than neglected hands and nails, because of our knowledge that they may be moulded into lines of beauty, and because we look for cleanliness in each particular of bodily care. Neglect of any part of this artistic, God-given means of expression—the human temple—displeases and grates upon our finer sensibilities.

The nature of the care required, outside of cleanliness, depends upon the individual. A hand lotion to soften the skin and to keep it smooth and white, may agree with one skin, but may disagree with another, and the treatment must be adapted, as must the treatment of the skin of the face, to the individual condition. However, all hands and nails should be kept thoroughly cleansed from dirt, the nails symmetrically trimmed, the cuticle about the nails unbroken and smooth. This takes a little daily care, but the care or the lack of it bespeaks woman's training and daintiness of nature.

Delicate hands daintily used are an unfailing indication of delicacy of thought and nature, and if used with

firmness, as well as daintiness, they combine strength of character as well as beauty of thought.

The Feet.

Perhaps no bodily member is of greater use and yet receives so little hygienic care as the feet. Intended by Nature to share in the general functions of the skin, they are encased in hard leather which does not admit of their free use of muscle;—while yet the muscles are in their cramped position they are required to bear and move the weight of the body. The almost air-tight shoes do not admit of an evaporation of waste, which is very profuse from the innumerable sweat glands in the soles, and there is no doubt that, though the skin, unless abraded, does not absorb impurities, these impurities, not having an opportunity to evaporate, must clog the glands, thus preventing perfect elimination, and prevents the free circulation of air about the glands; they are thus deprived of the oxygen, which should be breathed in through them, while the extreme heat to which they are subjected is weakening.

Is the shoe of commerce to-day a relic of civilization? Not if civilization is based upon knowledge and intelligence, for every intelligent person knows that for normal muscular and nerve strength and for complete elimination of waste, as well as for absorption of fresh air, the feet must have perfect freedom and a free circulation of air about them.

The sandal of the Greeks, perhaps the most perfectly formed race and the most intelligent, which simply strapped a sole upon the foot is the most hygienic manner of protecting the feet. Custom makes us reticent about baring the feet, but is it more immodest to expose the feet than the hands?

Surely there is no more dainty nor beautiful part of the body than a well-shaped, symmetrically curved foot, free from blemishes. A baby's foot is most tempting, and with reasonable care, the foot will retain its beauty of contour if untrammeled. The nerves of the feet are as delicate as in the hands; and the manner of handling

the feet in walking is expressive of just as much character as the manner of using the hands. Indeed, one can very soon learn to distinguish between a strong, a vascillating, a dogged, a careless or an artistic nature by the sound of the footfall.

Physicians learn to diagnose many diseases by their expression of disturbance in the feet. Perhaps the diseased organ which expresses its derangement in the feet in a most pronounced manner is the kidney; dropsical tendencies are expressed here early in the development of the disease.

That one may have a graceful, easy walk, it is of the utmost importance that the feet be kept strong and free from callouses, corns, or anything which may trammel their use. Often the uneven development in the shape and size of the hips may be traced to a tight shoe, a corn or some foot blemish, which changed the manner of walking, by reason of favoring one foot; the other foot was used more strongly and the hips develop accordingly. Such walk becomes ungainly, and one who is accustomed to study and correct the cause of ungainly walks can tell which foot has been sore—perhaps twenty-five years earlier—and can tell whether it was the heel, the toes, the inside or the outside of the foot.

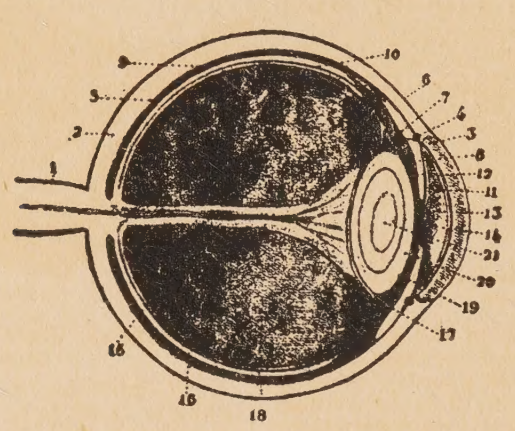
The utmost care should be exercised in the selection of shoes for children—the foot must have perfect freedom to develop strong and well. Do not be afraid of the foot growing too large—you cannot cramp its development without making large or misshapen joints, and a large, well shaped foot is far more beautiful than an ill shapen, small one—besides the interference with the free grace of movement means more, even, than the size of the foot. It is the beauty of contour more than the size which lends it charm.

The wearing of high heels throws the entire body out of poise; the walk becomes mincing and affected, while the effort of nature to maintain a normal balance brings

a strong strain upon stomach and abdominal muscles and upon the entire spinal column, often resulting in serious spinal or pelvic weakness or displacement of pelvic organs.

THE EYE

To go into the details of the anatomy and physiology of the eye, and the refractions of light, with the images produced upon the retina, would require a volume. The purpose here is to treat that phase of eye difficulties which can be helped through exercises to strengthen and



ANATOMY OF THE EYEBALL

1, optic nerve; 2, selerotic; 3, cornea; 4, spaces of Fontana; 5, choroid; 6, ciliary muscles; 7, ciliary processes; 8, iris; 9, retina; 10, Jacob's membrane; 11, anterior chamber; 12, posterior chamber; 13, pupillary area; 14, aqueous humor; 15, hyaloid membrane; 16, canal of Stilling; 17, canal of Petit; 18, vitreous humor; 19, capsule of the lens; 20, fluid of Morgagni; 21, lens.

stimulate the nerves and the muscles controlling the eye, as well as the natural cushion upon which the eye rests.

When the vision is defective, by reason of change in the form of the eye, such as astigmatism, hyperopia, or myopia, the treatment belongs alone to the oculist.

It is needless to state that all glasses should be prescribed by an oculist,—the optician, like the druggist, being qualified merely to fill prescriptions, but not to diagnose or prescribe.

There is no doubt but that the shape of the eye is

changed by the habits of childhood. Care should be taken not to frequently hold objects too close to the young babe, or the lens may become too convex, resulting in nearsightedness. Children should not be given too close work, but allowed to play out of doors much of the time where the range of vision is long. Too close application of the eye of the child to desk work at school is to be guarded against, and herein lies one grave danger in sending the child to school too early. Eight to ten years

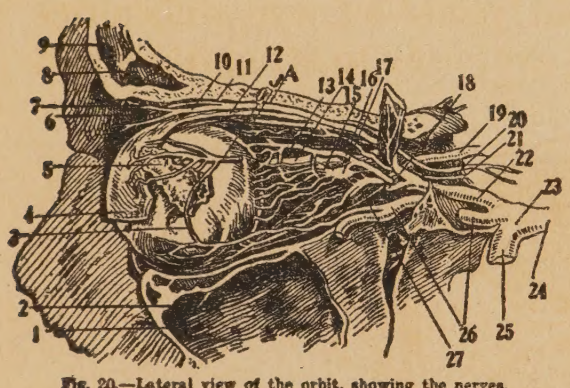


Fig. 20.—Lateral view of the orbit, showing the nerves. (After DEAVER.)

1, antrum; 2, bristle in the antrum; 3, loop between orbitral and lacrimal nerves; 4, tarsal plate; 5, lacrimal gland; 6, tendon; 7, pulley; 8, infundibulum; 9, frontal sinus; 10, supra orbital nerve; 11, supratrochlear nerve; 12, muscle; 13, rectus muscle; 14, optic nerve; 15, ciliary nerve; 16, nasal nerve; 17, ciliary ganglion; 18, lacrimal nerve; 19, motor oculi nerve; 20, patheticus nerve; 21, abducens nerve; 22, opthalmic division of fifth nerve; 23, gasserian ganglion; 24, fifth nerve; 25, inferior maxillary nerve; 26, superior maxillary nerve; 27, orbital nerve.

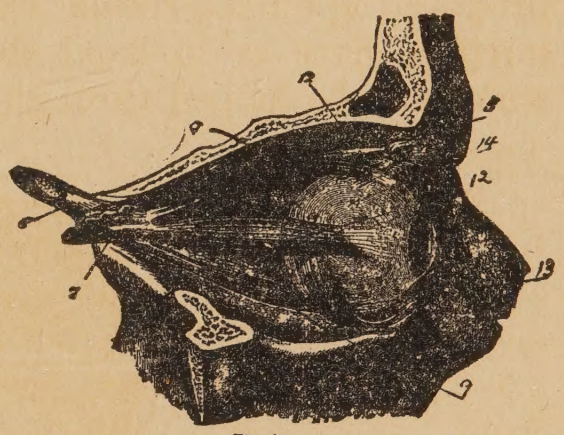


Fig. 697.

LATERAL VIEW OF THE MUSCLES OF THE EYEBALL

5, trochlea or pulley of the superior oblique muscle; 6, optic nerve; 8, superior; 9, inferior and 12, external rectus muscles; 13, inferior oblique.

It is by exercises and application of hot and cold compresses for strength and elasticity of these muscles and nerves that hygienic treatment strengthens the eyes and prolongs the normal sight.

of age is young enough for a child to enter school. Work in the early grades should be done from large charts at a distance.

Reading in a recumbent attitude or reading on a car or train is very injurious. Dotted veils are injurious, also.

If there is a defective blood supply, nervous exhaustion, if the secretions are abnormal or if there is any functional or organic change in the body, the eye may

participate in the evil consequences;—in the same way visual defects may influence the entire system.

Glasses should be changed at frequent intervals, particularly for children or adults who are changing in stature.

The question often arises as to why so many more people wear glasses than formerly. People read and study, thus straining the eye more, and doubtless the early age at which children enter school, the crowding of the school curriculum with the attending nerve strain and effect upon the general health and development has much to do with this.

The eyes are intimately connected with the whole human economy and the muscles and nerves of the eyes respond to exercise and hygienic treatment quite as readily as the muscles and nerves in other parts of the body, and the brightness and strength of the eye depends largely upon the general health, as does the expression of any other member.

Accommodation. If two objects be selected, one near the eye, the other at a distance away, it will be noted that when the eye is focused so that the object near at hand is distinct, the one at a distance will be indistinct—again direct the thought to the object at a distance and the one near at hand will be indistinct. Clearly the eye has the power of changing the focus as directed by the mind through the muscles. This is done by changing the convexity or curvature of the front surface of the crystalline lens, partly through its own elasticity and partly through the action of the ciliary muscles. When the eye is to be accommodated for near vision, the ciliary or "reading muscle," contracts and shortens, thus drawing the outer sides of the lens together. This may be illustrated by compressing a rubber ball—if the ball be compressed laterally it becomes more convex at the apex.

If, then, the ciliary muscles become weakened, by rea-

son of a general run down condition of the system, by over-strain, as a result of too constant use, or by the general debility of old age, it will fail to contract and cause the curvature; thus the eye is focused only for more distant objects.

In general debility the lens also loses its elasticity. It is then that glasses containing convex lens, focusing the rays of light upon a near object, are used.

If then the ciliary muscle can be strengthened by special exercise for them, or by resting the eye from the effort to read, or to see things at a near range, or by building up the general vitality, the vision will adjust itself, and glasses which may have been prescribed to bring the focus nearer so that the ciliary muscle may not be over-strained, but be given a chance to rest, may be discarded.

There is a common fallacy, among those who have not made the eye a study, that if a glass be once worn, the muscles, being relieved of their necessity for contraction, will lose their elasticity and power of adjusting the lens. This may be true if the glasses be worn continuously, but glasses to correct general weakness of the eye muscles should be worn long enough to allow the eye to rest and then only when the eye is to be subjected to an unusual strain. If there be a structural difficulty in the eyeball, however, the glasses need to be worn continuously.

The use of cold water upon the eyes, or the alternation of hot and cold water, together with exercise and proper attention to diet, bathing and breathing, which insure complete metabolic activity and strength of the system, will improve not only the strength and elasticity of the ciliary muscles but the elasticity of the lens as well, and by care of the general health the eyesight may be preserved for a much longer time.

In the use of hot and cold water the general principle

governing their application must be borne in mind.—Hot water is applied where muscles and nerves need immediately relaxing and where the capillaries have been unduly overstrained or distended; e. g., where the eyes are bloodshot or the eyelids red. Hot milk will also be salutary. Cold water is used where it is desirable to gain a better strength of the metabolic activity, as is the case of a general weakened condition of the eyes. Cold water, to create a better activity in carrying away waste and assimilating nourishment, may be alternated with hot water for relaxation.

Figure 1 gives the outline of the eye and the names by which different parts are known; Figure 2 shows the muscles and the nerves controlling the eye. It is the muscles shown in this figure, and the nerves which control the muscles, which can be strengthened directly by exercises for the eye, by the use of lotions, and by hot and cold water judiciously applied.

Astigmatism. Astigmatism, which is perhaps one of the most common divergences from the natural development of the form of the eye, occurs where the curvature of the crystalline lens of the eye is not uniform; in consequence the rays of light, which pass through each portion of the lens, will not be brought to a focus at the same point, and the eye is termed astigmatic. In such cases the cornea is much more curved vertically than horizontally. The difficulty is common, but often outgrown; it can be corrected by glasses fitted with cylindrical lens.

Short-sighted or Myopic Eye. The cause of the myopic eye usually depends upon the congenital and frequently hereditary elongation of the eyeball. The eyeball of the myopic eye is elongated, so that the lens of the eye is more convex, as seen from the front. The relief is in concave lens which causes the rays of light to converge that they can be brought to a focus upon the retina.

Long-sighted or Hypermetropic Eye. The long-sighted, or hypermetropic eye, is elongated vertically so that the lens of the eye is flattened and the relief is in a convex lens, as parallel rays would otherwise come to a focus behind the retina. The cause of the hyperopic eye is generally due to imperfect development in all directions.

Old Sight or Presbyopia. The mechanism of the eye is marvelously delicate—the lens most delicately elastic, and in age the lens become harder, less elastic and less easily adjusted, and the power to increase its curvature is lost. In a word, the function of accommodation begins to fail and the eye must be fitted with the convex lens.

Diseases of the eye, as well as structural defects in the lens, belong to the oculist, but the eyes are often affected by disease or general weakness of some other organ of the body, particularly by a weakness of the nervous system.

Dark Circles. As stated above, the nerves about the eyes are most delicate and respond at once to worry and displeasure occasioned by outside influence or by worry occasioned by physical ills, and a derangement in any part of the body, which in any way affects the nerves, the circulation, or the composition of the blood, so acts upon the fat globules that they almost disappear, allowing the eye to sink; the pigment in the skin about the eye often increases. No part of the face so quickly expresses the general condition of the physical being, and so accurately registers the degree of nerve strength, or the poise of brain, and character of thought, as the eyes, and they respond most quickly to the general toning of the system.

As one approaches the meridian of life, the muscles and nerves about the eyes need daily massage to keep them firm and strong. On account of their delicacy, however, the massage should be given under careful direction.

Puffs under the eyes are often an early sign of disease of the kidneys or of the heart.

The muscles about the eyes, which give the eye its expression, contain a perfect network of nerves which respond to the most delicate change of thought; and the expression of the eye, therefore, responds more delicately to our thoughts than the expression in any other part of the body.

The muscles about the face are also exceedingly delicate and very susceptible to nerve impulse if kept free and the skin elastic, and they particularly respond to our emotions. The expression given to the eye is given by the slightest change of the muscular poise of the eyelids and the muscles about the eye, rather than to any change in the eye itself.

The eye has been well named the "window of the soul," because of the delicate susceptibility, of nerve and muscle surrounding it, to emotional impulse.

THE EARS

All cases of difficult hearing should be referred to the aurist, as diseases of the eye should be referred to the oculist. These two senses are so important to the happiness and development of the individual that every care should be taken to arrest any impending danger.

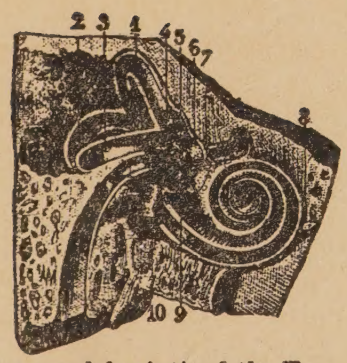
It is not the purpose here to enter into the anatomy and physiology of the ears,—the subject requires a more minute detail than space will permit; the purpose here is to treat such phases of ear difficulties as can be effected by hygienic treatment.

The hearing, as well as the eyesight, is materially affected by the general strength and vitality of the system; because normal vitality means a normal strength of nerves, forceful circulation, pure, well-nourished blood

and full breathing; it means, also, perfect bodily activity in all cells, in tearing down and removing the waste of the system and in converting the nourishment contained in the food into body tissue.*

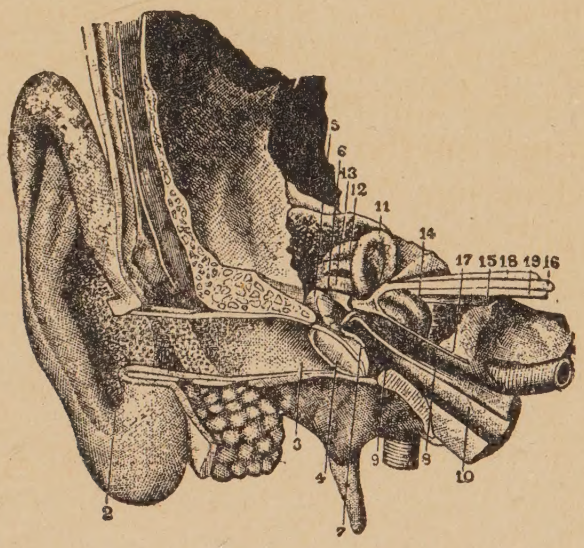
It is important, for strength of tissue and nerve, that this activity be normal in the ear. The importance of full breathing of fresh oxygen, as has been repeatedly urged, is of vital importance in maintaining metabolic activity.

At the end of the canal which extends inward from



Osseous labyrinth of the Ear.

1, 2, 3, semicircular canal; 4, vestibule; 5, ampulla; semi-elliptica; 6, hemispherica; 8, cochlea; 9, spirilis ossea: 10, foramen rotundum.



THE EAR.

2, concha; 3, auditory canal; 4, drum head or tympanic membrane; 5, incus; malleus; 7, manubrium mallei; 8, tensor tympani; 9, tympanic cavity; 10, Eustachian tube; 11, 12, 13, semi-circular canal; 14, cochlea; 15, internal auditory canal; 16, facial nerves; 17, 18, 19, nerves.

the outer ear, and continuous with the skin of the canal, is a thin membrane stretched across it, known as the tympanic membrane, or drum head. Its function is largely protective, though it receives the sound waves, and aids in conveying them to the middle ear through the little ear bones connected with it. The waves of air vibrate against the drum head, which causes a vibration in the middle ear, from which the nerves convey the impression to the brain.

PUBLISHER NOTE: See "Foods" by Susanna Cocroft.

The drum head is not essential to hearing. Low tones may be heard less distinctly because of its absence, but loud tones quite as well. The drum head often becomes punctured; this is deplored, because of the removal of the protection to the middle ear and because the ear may become too dry; but the belief that it is essential to hearing is no longer held.

The nerves of the ear, which receive and carry the sound waves, are so deeply located that they are not reached by outward applications and are affected only by building up the general health.

The middle ear, the drum, or tympanum, is the intricate air space within the petrous portion of the temporal bone, communicating with the pharynx through the Eustachian tube. It is developed outward from that portion of the air passages where nose and throat meet—known as the naso-pharynx.

The naso-pharynx is the space back of the nose—its roof is formed by the base of the skull, its back by the vertebræ of the neck, its front by the ends of the nostrils, its floor by the soft palate, and its lateral walls by the trumpet-shaped mouths of the Eustachian tubes, which connect the middle ear with the naso-pharynx and supply the ear with air.

There are two air systems: with each inhalation a part of the air goes down through the trachea to the lungs and a part goes through the upper air chamber—the naso-pharynx—and the Eustachian tubes to the ears.

The whole middle ear is lined with a mucous membrane continuous with that of the nasal passages. The mucous which exudes from the mucous membrane is worked down from the middle ear into the Eustachian tube, and thus from the naso-pharynx into the throat.

The Eustachian tube, then, is important as a drainage tube from the ear to the throat, but its ventilating function is equally important, the air in the drums being

necessary for their proper strength, auditory tension and equillibrium of the transmitting tissues.

Without the normal amount of air in the middle ear, or drum, the mechanism of the drum is defective; as the air in an ordinary drum is necessary to keep the drum heads from drawing inward to fill the vacuum and thus stretching and weakening them, just so the air in the middle ear is necessary to prevent the drum head from sinking back within the tympanum. It will be readily seen how materially breathing, which retains a pressure within the drum equal to the pressure without, strengthens them, and holds the membranes at proper tension.

If the Eustachian tube be closed, or partly so, the sounds will not only reverberate unnaturally within, but the air will be absorbed by moist walls, the partial vacuum will affect the ill-supporting drum membrane, and the pressure from without, being greater than the pressure from within, the stapes will press too closely upon the labyrinth causing deafness or dizziness, or subjective noises, and there will be a tendency to congestion.

Normally, every act of swallowing, yawning, or breathing opens the tubes and gives a chance for equalization, unless the nose be stopped up—this reverses the process, —if the Eustachian tubes are likewise clogged every swallowing motion draws air out of the ears.

In swallowing the mouth of the Eustachian tube is slightly elevated and the air more readily passes from the naso-pharynx to the middle ear. Thus air can be readily forced into this air chamber by blowing air into the nostril during the act of swallowing and the ear drums can be thus forced back to position. The Politzer bag is used for this purpose, but it should be used only upon the direction of an aurist, or the drums may be overstrained. Special breathing exercises, which systematically force a full amount of air into the air cham-

ber about the drum, are especially adapted to strengthening it, without danger of overstrain.

The tissues here are delicate and the regular practice of breathing exercises, daily, is Nature's method of retaining their strength. Exercises for the neck, to keep the Eustachian tubes free, also exercises for the palate, are particularly valuable in maintaining the general strength of the ears. The constrictor or palate muscles are blended with those of the ear drum and the Eustachian tubes, and they control the movement of air in the upper air tract.

The reason that catarrh, which, more or less, closes the nasal passages, causes deafness will be readily seen, because of the clogging of the nasal passages and Eustachian tubes, but catarrh, and its resultant deafness, can often be overcome by persistent attention to special breathing exercises, exercise to keep open the nasal passages, to stimulate the nerves to them, and exercises to create an active removal of waste through the tubes.

In case of catarrh, where the mucous discharge is great, the freedom of the Eustachian tube is of the utmost importance, since the mucous must pass through it to the throat; it is of the utmost importance that the mucous be removed, or it may become infected, pus may form, and an abscess result.

In children the greater part of the roof of the nasopharynx is covered by what is called the third tonsil and the enlargement of this, by adenoid growth, is grave, because it may possibly involve the Eustachian tube and the middle ear and result in deafness.

Habitual stopping up of the nose in children is serious, as chronic deafness may result from neglect of this condition.

Ear wax is formed by glands, like the sweat glands. As these glands are in the outer two-thirds of the auditory canal, no wax forms near the drum head. A healthy ear should never show more wax than will render

the hairs within sticky. Sometimes, however, the water which enters the ear in bathing will harden the wax and it will not work itself away naturally. Collecting gradually for months, one sometimes becomes suddenly deaf by reason of the wax hardening and entirely closing the canal. Great care must be exercised in its removal. Careful syringing with hot water (105 degrees to 115 degrees F.) is the proper manner of removing it, and never with a hard substance which may push it inward and injure the drum. An ear which has been syringed should be dried and protected with cotton for the remainder of the day. Cotton should not be worn in the ear continuously, however.

In the foregoing we have illustrated the causes of most cases of deafness. Every cold in the head more or less involves the ears.

Earache, arising from colds, usually means inflammation and is relieved by heat—hot water in the ear or hot water applications about it are the best relief. It must be remembered, however, that severe inflammations cannot be relieved at once. Rest in bed, with light diet, are desirable, as severe exercise may increase the pain. The Eustachian tubes should be kept free that the secretions may pass away and not unduly press upon the ear drum —yet sometimes where there is a serious catarrh of the drum, relief will be obtained only by an outbreak through the drum head. Few children escape attacks of this kind.

The old-fashioned night cap protects the entire region of the ear and is preferable to cotton in the ears. One sleeps on one side of the face and when turning exposes the ear to a sudden change of temperature which is disastrous to inflamed ears. The night cap prevents this sudden change.

Constipation, or any cause of head congestion, should be removed.

When weakened by disease, small pressure may punc-

ture the ear drum—a box on the ear sometimes causes a puncture, but the middle ear is the source of most of the aural trouble.

Noises in the ear have no definite relation to defective hearing; however, they are often associated with it. Their cause is as varied as their character. They are generally caused by irritation of the nerve ending in the ear, caused by pressure; however, anæmia, plethora, catarrh or blood changes may cause them. The seat of the irritation is often in the nose.

In other cases, the general vascular condition, and especially the over-action of the heart, may cause them.

Another form of noise, which bystanders can hear, is a clicking due to opening of the Eustachian tube when the soft palate is lifted.

It has been calculated that about one-third of our adult population are deaf in one or both ears.

LECTURES *by* SUSANNA COCROFT

GROWTH IN SILENCE

"Enter into thine inner chamber and shut the door."
"There is a divine sequence, a golden thread running through the lives of all men and women of truly great and lasting power."—R. W. TRINE.

A GOOD FIGURE—OBESITY, LEANNESS—(Illustrated)

"Style is in the carriage, not in the gown."
"No woman is to blame for not being beautiful at sixteen, but she has only herself to blame if she is not beautiful at forty."—FRA LIPPO.
"Few women know how to stand, to sit or to walk without undue expenditure of nerve force."

IDEALS AND PRIVILEGES OF WOMAN

"The normal woman is happy if well."
"Her first duty is to herself. To be a good mother she must first be a perfect woman."
"She has not only her rights as a true woman, but the devoted homage and service of man."

THE CIRCULATORY SYSTEM—Heart, Lungs, Arteries, Veins, Lymphatics and Blood

Miss Cocroft has spent years in the practical study of anatomy and physiology. This lecture follows the blood from the heart on its complete circuit of the body back to the heart—showing the dangers and results of sluggish and of impure blood flow, with resultant physical ailments and their relief. No student of physiology should be without it.

BODY MANIKIN AND POSITION OF VITAL ORGANS

The body manikin with but few additions is sold to physicians for $5.00. This manikin is printed in seven colors and includes fourteen different plates, showing the muscles, blood vessels, nervous system, the organs of respiration, digestion and all other vital organs, each in its exact relation to the other. It enables a woman to look within her *physical self* and to understand the many facts about herself which Miss Cocroft explains in her lessons—facts which every woman, wife and mother should know—facts which it is a sin for her not to know.

CHARACTER—As Expressed in the Body—(Illustrated)

"How can I hear what you say when what you are is forever thundering in my ears."—EMERSON.
True grace is visible expression of graciousness.
Grace, womanly dignity. self control, ease of manner, laziness, indifference, lack of energy and ambition, moral weakness, or moral courage, each has its expression. Not only how to thus read character, but how women can best express it in herself is the theme of this address.
"The secret of the highest power is in uniting the outer agencies of expression with the power that works from within.

THE NERVOUS SYSTEM—Effect of Habit upon Life

This lecture includes a clear description of the nervous system, its functions and its influence upon various parts of the body. Many of woman's physical ills are traceable to shattered nerves, and many such ills yield with astonishing readiness to the influence of a rightly directed mind. Habit is a marvelous gift of nature. Rightly used, it lengthens life and is a great conserver of energy. Wrongly developed habit is a check to growth.

SELF-SUFFICIENCY—Mental Poise

"The great man is he who, in the midst of a crowd, can keep with perfect sweetness the serenity of solitude."-EMERSON.
"Man has two creators: The Infinite, who created the atoms and the laws by which the atoms take form; and himself, the moulder of the form, and the moulder of thought and character."
"It is not a soul, it is not a body we are developing, but an individual."—MONTAIGNE.
Belief in self is the first element in success.

FOODS—Nutritive Value and Digestibility

The problem of proper nutrition for the body is as vital as any study effecting the morals, health and the consequent power of a nation, since upon the kind, quality and quantity of food depend the sustenance, health and strength of its citizens.

MOTHERHOOD

The life, the vitality, the mental capacity, the moral character of the child depend directly upon the strength, the character, the mental attitude of the mother. Motherhood is woman's most sacred privilege and the true mother finds greatest joy in fitting herself to fulfill that privilege in the most beautiful way. How woman may best equip herself for motherhood and how the mother may preserve herself and prolong her usefulness to her children, is clearly set forth in this lecture.

THE VITAL ORGANS—Liver, Stomach, Intestines, Kidneys—their Use and Abuse

The whole treatise is so lucid and so simply told that all can perfectly understand it, and the body manikin shows the organs referred to and renders the explanations absolutely clear. This lecture is full of practical, everyday health hints.

AIDS TO BEAUTY—Skin, Hair, Eyes, Teeth, Hands, Feet and Ears

Life is made up of little things—and so is beauty. No woman can be truly beautiful or wholesome who neglects the details of her toilet. Indeed, these little things are a constant index of character. This lecture gives many health and beauty hints which some women have paid hundreds of dollars to learn.

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